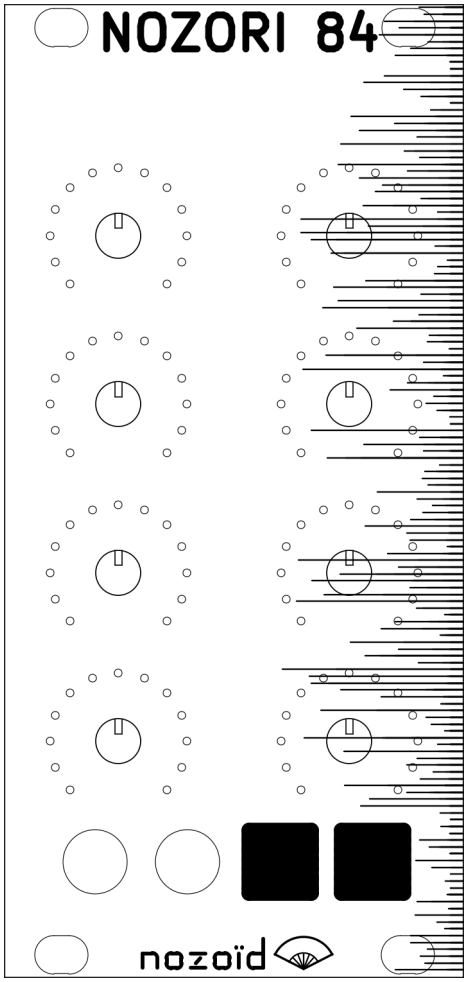
NOZORI 84 modules documentation

A single piece of paper can be folded into innumerable shapes. In the same way, a single Nozori hardware can morph into multiple modules. Changing functionality is as simple as changing jumpers position!



2019 01 09
Http://nozoid.com

Nozori common specification

Lot’s of Nozori module share the same philosophy. Unless specified, here are some behaviors commonly found on various module.

The 3 way toggle of audio source usually deal with the range of the frequency (FQ) potentiometer:

- On top, (HIGH) the frequency potentiometer scan on the full audio range.

- In the middle position, (MEDIUM) the range is reduce in order to be easily used with a 1V/Octave input.

- On the bottom (LOW), the frequency range is very low in order to generate low frequency modulation.

For audio effect module, the 3 way toggle can be used to select the audio mode of the module:

- On top (STEREO), the module admit 2 audio inputs. This inputs are processed with the same parameters.

- In the middle (OPPOSITE), the module admit 2 audio inputs, but the processing parameters can be different for the 2 inputs: the modulation CV are applied at opposite polarity on the left and the right channel.

- On the bottom, (MONO + PAN), the module accept only 1 audio input. If plugged, the other input is used as a panoramic control to split the out.

In STEREO and OPPOSITE mode, if the IN right jack is not plugged, the left signal is used for the right channel. (you can generate a stereo output using a mono input in the OPPOSITE mode). In MONO mode, when the PAN jack is not plugged, the signals out are at full amplitude on both output.

Audio source module (like VCO), output 2 different octave of the same signal, unless a jack is plugged in the panoramic input. In this situation, a single signal is splited to the left and right out. The panoramic input range should be in the -5 / +5V range

The amplitude of an audio out is in the -5 / +5V range, unless a jack is plugged in the GAIN input. In this situation the output is amplified thanks to a VCA . The gain is exponential with input ranges from 0 to +5V.

Most of the time, when no modulation jack is plugged, the associated potentiometer control the amplitude of a chaotic LFO included in the module. A notable exception is the frequency modulation potentiometer that is used as a “fine tune” : it’s range is 1 octave.

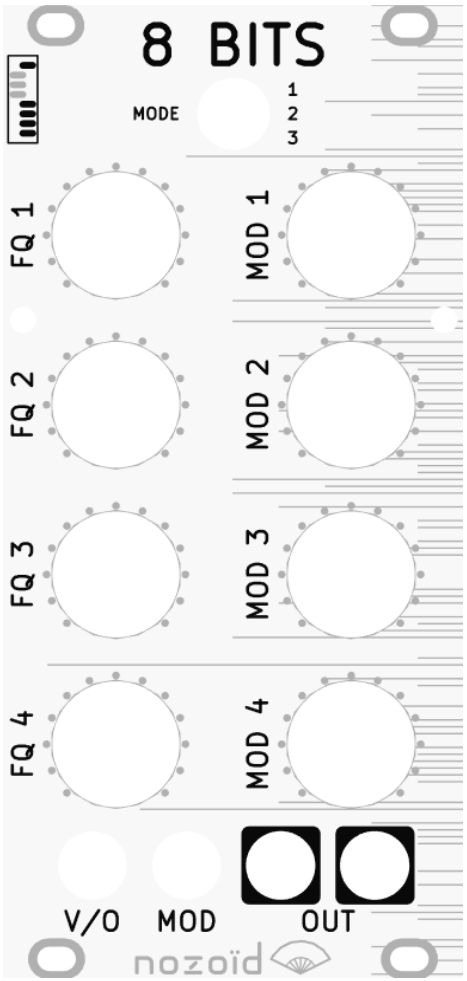
When a pitch modulation potentiometer is at full modulation, the range is 1V/Octave.

Modulation CV should be in the -5/+5V range. Positive voltage added to the controlled value, while negative voltage are subtracted. The total value is clipped in the range of the main control: you can not go higher or lower than the potentiometer range thanks to a modulation. (this rule accept some exception like for oscillator frequency). The range of the modulation is the half of the main range : in order to sweep the full range, you should put the main potentiometer halfway, and the modulation potentiometer at full modulation.

When the module do generate CV, the leds indicate CV input value (or default value).

When a signal is provide on a SYNC input, the frequency potentiometer adjust a divider/multiplier of this clock (1/16, 1/8, 1/4, 1/2, 1, 2, 4, 8, 16), while the frequency modulation potentiometer adjust fraction of this clock : (1, 3/4, 4/5, 7/8, 8/7, 5/4, 4/3). In this situation, the frequency Potentiometer should be halfway, and the MOD Potentiometer should be at 0 in order to use the frequency of the input. The phase is not respected between the clock input and the internal clock.

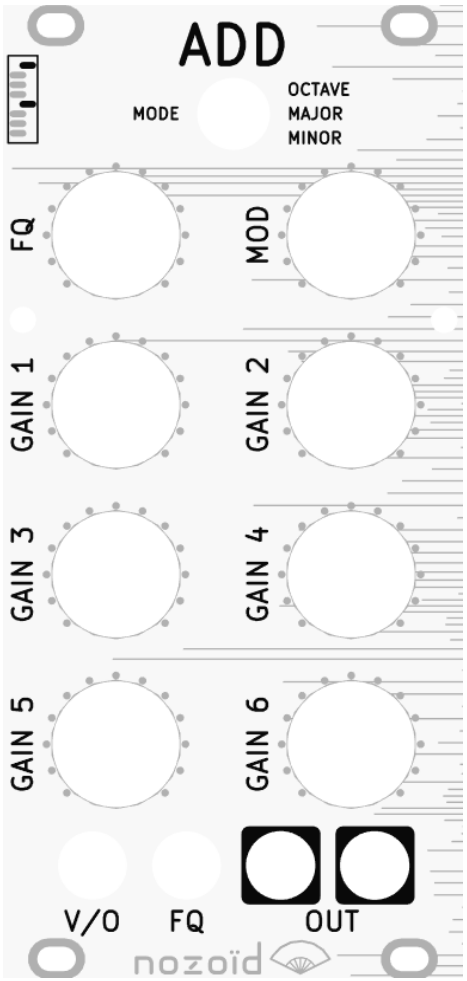
8 Bits



8 bit audio generator
Module number: 143 (10001111)
Potentiometer 1: Frequency of oscillator 1 (from 6Hz to about 2KHz)
Potentiometer 2: Frequency modulation of oscillator 1
Potentiometer 3: Frequency of oscillator 2 (from 6Hz to about 2KHz)
Potentiometer 4: Frequency modulation of oscillator 2
Potentiometer 5: Frequency of oscillator 3 (from 6Hz to about 2KHz)
Potentiometer 6: Frequency modulation of oscillator 3
Potentiometer 7: Frequency of oscillator 4 (from 6Hz to about 2KHz)
Potentiometer 8: Frequency modulation of oscillator 4
In 1: Frequency (1V/Octave) (0V if unplugged)
In 2: Frequency modulation value (1V if not plugged)
Out 1: Audio out 1
Out 2: Audio out 2
Selector: algorythm Top: 1+2 XOR 3+4 // 1+4 XOR 2+3 Middle: 1 XOR 2 // 3 XOR 4 Bottom: 1 & 2 // 3 & 4

This module mix 4 oscillator (8 bits sawtooth) in various ways in order to create cheap tune.

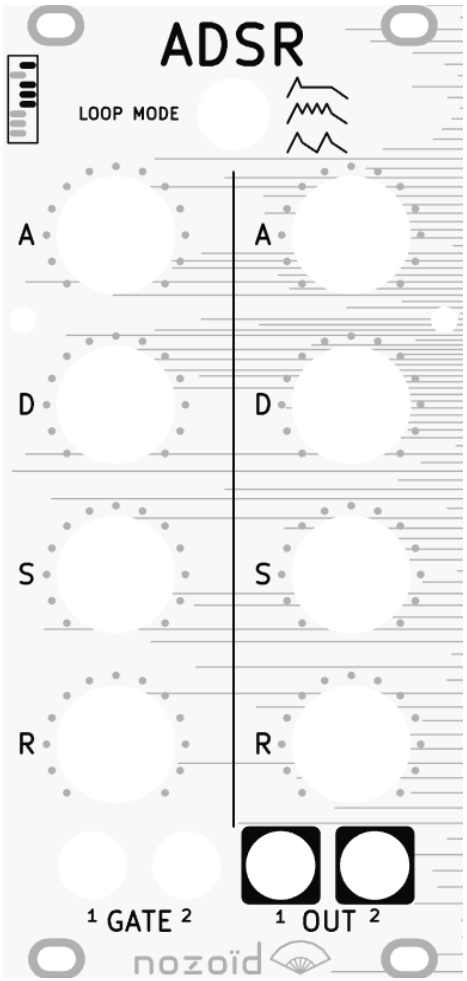
Additive Oscillator



Sinusoidal oscillator with 6 different harmonics
Module number: 136 (10001000)
Potentiometer 1: Main frequency (from 3Hz to about 5KHz)
Potentiometer 2: Frequency modulation
Potentiometer 3: Harmonic 1 amplitude
Potentiometer 4: Harmonic 2 amplitude
Potentiometer 5: Harmonic 3 amplitude
Potentiometer 6: Harmonic 4 amplitude
Potentiometer 7: Harmonic 5 amplitude
Potentiometer 8: Harmonic 6 amplitude
In 1: Frequency (1V/Octave) (0V if unplugged)
In 2: Frequency modulation value (1V if unplugged)
Out 1: Oscillator out
Out 2: Oscillator out (same as out 1, but without the fundamental)
Selector: Harmonic frequency Top: Octave (+12, +24, +36, +48, +60, +72 half tone) Middle: Major scale (+2, +4, +5, +7, +9, +11) Bottom: Minor scale (+2, +3, +5, +7, +8, +10)

Add up to 6 different harmonic to a sinusoidal signal! The tuning of this harmonics can be change with the 3 way switch.

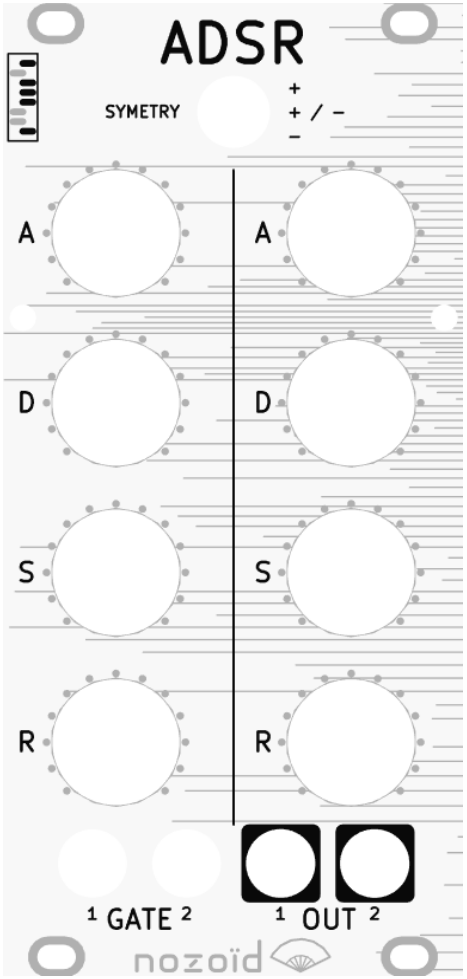
ADSR



Dual ADSR with loop mode
Module number: 184 (10111000)
Potentiometer 1: ADSR 1: Attack time (from 0.5ms to 90s)
Potentiometer 2: ADSR 2: Attack time (from 0.5ms to 90s)
Potentiometer 3: ADSR 1: Decay time (from 0.5ms to 90s)
Potentiometer 4: ADSR 2: Decay time (from 0.5ms to 90s)
Potentiometer 5: ADSR 1: Sustain level
Potentiometer 6: ADSR 2: Sustain level
Potentiometer 7: ADSR 1: Release time (from 0.5ms to 90s)
Potentiometer 8: ADSR 2: Release time (from 0.5ms to 90s)
In 1: Gate 1 (default to gate OFF exept in ADSR loop mode (bottom selector) where the GATE in ON by default)
In 2: Gate 2 (default to Gate 1 if unplugged)
Out 1: ADSR 1
Out 2: ADSR 2
Selector: loop mode Top: no loop Middle: AD loop: start an attack at the end of the decay time Bottom: ADSR loop: start a release at the end of the decay time and start an attack at the end of the release time

A dual ADSR, with 2 different kind of loop mode. This are exponential ADSR for a more natural sound evolution.

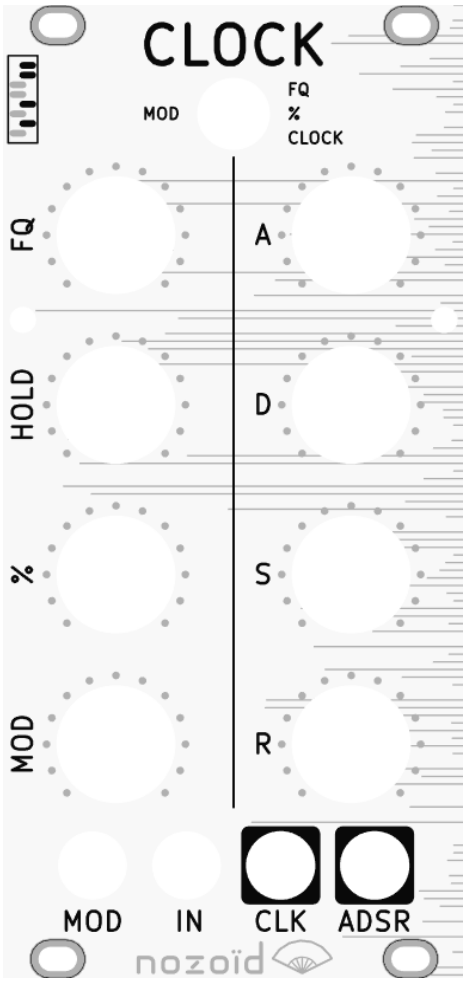
Symetrical ADSR



ADSR with positive or negative output
Module number: 185 (10111001)
Potentiometer 1: ADSR 1: Attack time (from 0.5ms to 90s)
Potentiometer 2: ADSR 2: Attack time (from 0.5ms to 90s)
Potentiometer 3: ADSR 1: Decay time (from 0.5ms to 90s)
Potentiometer 4: ADSR 2: Decay time (from 0.5ms to 90s)
Potentiometer 5: ADSR 1: Sustain level
Potentiometer 6: ADSR 2: Sustain level
Potentiometer 7: ADSR 1: Release time (from 0.5ms to 90s)
Potentiometer 8: ADSR 2: Release time (from 0.5ms to 90s)
In 1: Gate 1
In 2: Gate 2 (default to Gate 1 if unplugged)
Out 1: ADSR 1
Out 2: ADSR 2
Selector: out mode Top: both ADSR are positive Middle: ADSR 1 is positive, ADSR2 is negative Bottom: Both ADSR are negative

A dual ADSR, that can be either positive, or negative. This are exponential ADSR for a more natural sound evolution.

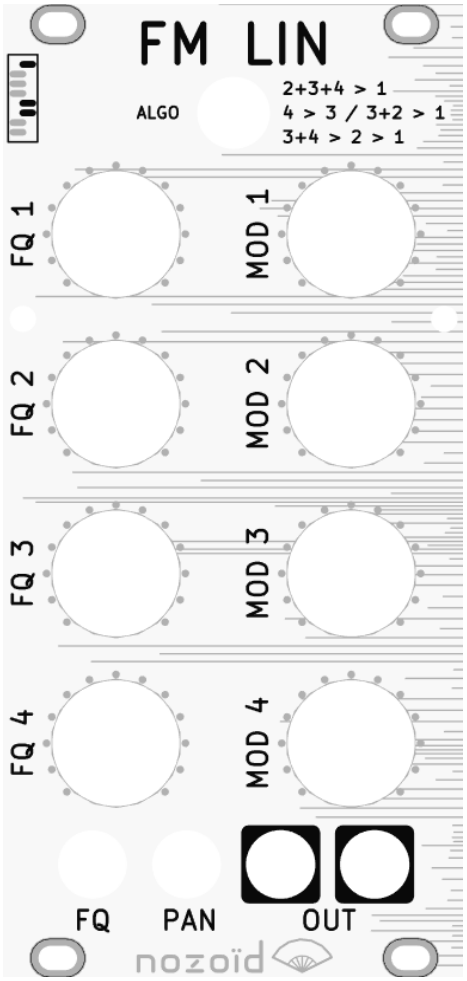
Clock / ADSR / VCA



Stochastic Clock with ADSR and VCA
Module number: 202 (11001010)
Potentiometer 1: Clock Frequency (from 17s to 10ms)
Potentiometer 2: ADSR: Attack time (from 0.5ms to 90s)
Potentiometer 3: Hold time of the clock (from 0% to 100% of the clock time)
Potentiometer 4: ADSR: Decay time (from 0.5ms to 90s)
Potentiometer 5: Syncope percentage of the clock (0% for all clock, 50% : 1 every 2 clock signal is randomly skipped, 100% : no clock)
Potentiometer 6: ADSR: Sustain
Potentiometer 7: Modulation
Potentiometer 8: ADSR: Release time (from 0.5ms to 90s)
In 1: Modulation (chaotic oscillator if not plugged)
In 2: VCA audio in (5V if unplug in order to output the envelope)
Out 1: Clock out
Out 2: VCA out (ASDR out if in 2 is not plugged)
Selector: Modulation influence Top: Clock frequency Middle: syncope percentage Bottom: bypass the clock for a direct control of the ADSR (via the MOD input)

This module is a clock generator, with included ADSR and VCA. (It output the ADSR signal if no audio In is provided, or the VCA out otherwise).
Only a random part of the clock can be send to the ADSR, with varying proportion thanks to the “%” potentiometer. A modulation input parameter can be used to modulate this proportion, the frequency, or to be used as an external trigger.
The ADSR curve are exponential.
In clock mod, the input 1 bypass the clock generator and the module use this external clock. This clock can be divided by 1 to 8 depending on the MOD potentiometer.

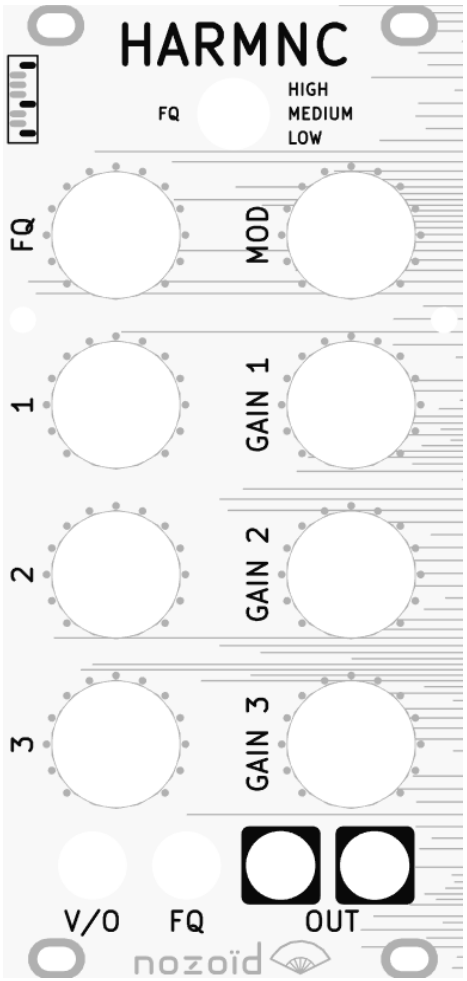
Sinusoidal Linear FM modulation



4 oscillators linear FM modulation
Module number: 140 (10001100)
Potentiometer 1: Oscillator 1 frequency (from about 7Hz to 10KHz for audio out left)
Potentiometer 2: Oscillator 1 frequency modulation
Potentiometer 3: Oscillator 2 frequency (from about 2Hz to 7KHz)
Potentiometer 4: Oscillator 2 modulation gain
Potentiometer 5: Oscillator 3 frequency (from about 2Hz to 7KHz)
Potentiometer 6: Oscillator 3 modulation gain
Potentiometer 7: Oscillator 4 frequency (from about 2Hz to 7KHz)
Potentiometer 8: Oscillator 4 modulation gain
In 1: Oscillator 1 frequency modulation value (1V if unplugged)
In 2: Panoramic (1V if unplugged)
Out 1: Left output
Out 2: Right output (1 octave higher than out left if “pan” in not plugged)
Selector: Connection order of the oscillators Top: Oscillators 2, 3 and 4 controls the oscillator 1 frequency Middle: Oscillators 2 and 3 control the oscillator 1 frequency, oscillator 4 control oscillators 3. Bottom: Oscillators 3 and 4 control the oscillator 2 frequency, oscillator 2 control oscillators 1.

Frequency modulation (linear/sub zero) of 4 sinusoidal signals using 3 different algorithm. This module is a sound generator.

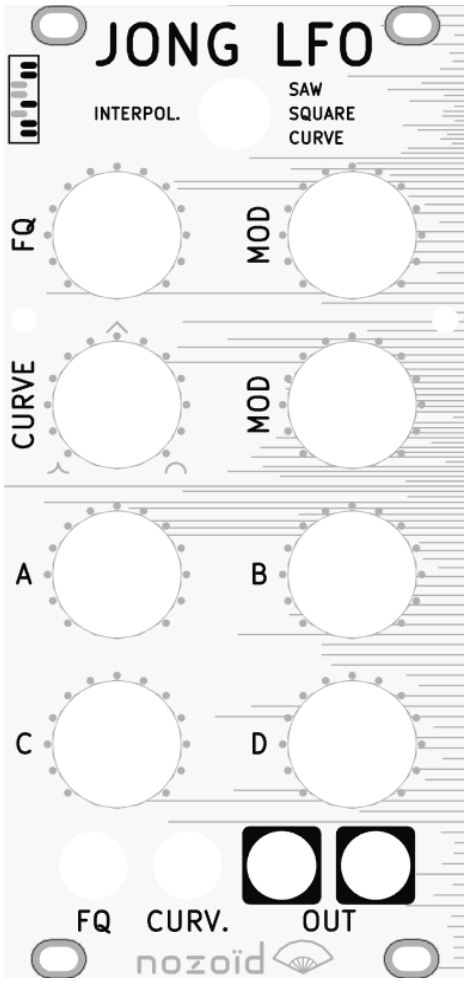
Oscillator with harmonics



Sinusoidal oscillator with 3 harmonics at variable relative frequency
Module number: 137 (10001001)
Potentiometer 1: Main frequency
Potentiometer 2: Frequency modulation (from about 7Hz to 20KHz)
Potentiometer 3: Harmonic 1 relative frequency (1 Octave range)
Potentiometer 4: Harmonic 1 amplitude
Potentiometer 5: Harmonic 2 relative frequency (2 Octave range)
Potentiometer 6: Harmonic 2 amplitude
Potentiometer 7: Harmonic 3 relative frequency (2 Octave range)
Potentiometer 8: Harmonic 3 amplitude
In 1: Frequency (1V/Octave) (0V if unplugged)
In 2: Frequency modulation value (1V if unplugged)
Out 1: Oscillator out
Out 2: Oscillator out (same as out 1, but without the fundamental)
Selector: Frequency range Top: High (10~20000Hz) Middle: medium (0.1~200Hz) Bottom: low (0.01~20Hz)

Add 3 harmonics to a sinusoidal signal. The frequency of the harmonics can be adjusted from 0 to 1 octaves regarding the fundamental frequency. (2 octave for harmonics 2 and 3).

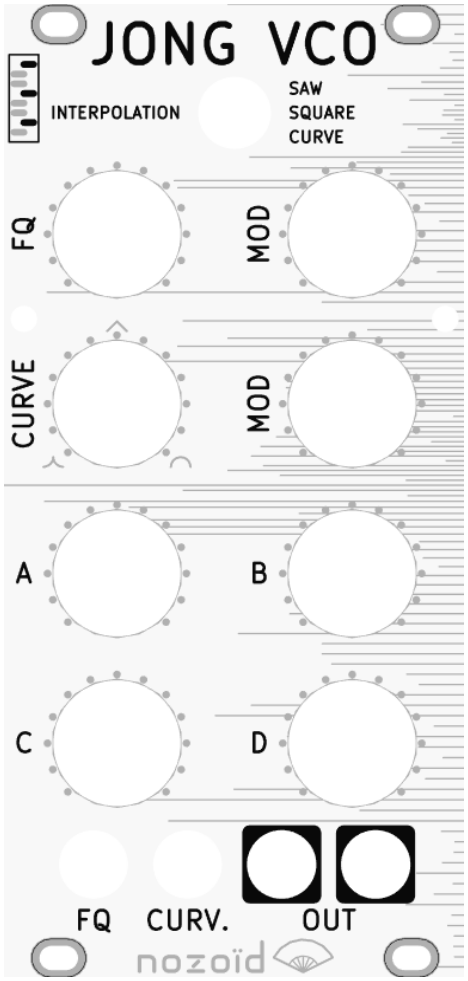
Peter De Jong LFO



Peter de Jong chaotic attractor
Module number: 203 (11001011)
Potentiometer 1: Frequency of the 1st oscillator (from about 13s to 10ms per steps)
Potentiometer 2: Frequency modulation
Potentiometer 3: Curve (exp/lin/log)
Potentiometer 4: Curve modulation
Potentiometer 5: 1st parameter of the attractor
Potentiometer 6: 2nd parameter of the attractor
Potentiometer 7: 3rd parameter of the attractor
Potentiometer 8: 4th parameter of the attractor
In 1: Frequency modulation value (chaotic oscillator if not plugged)
In 2: Curve modulation value (chaotic oscillator if not plugged)
Out 1: X out
Out 2: Y out
Selector: interpolation type Top: linear (saw) Middle: none (square) Bottom: cubic (curve)

This module is a strange attractor : it generate pseudo random value at various frequency. This module can be used like a step sequencer or a LFO. The 4 parameters (A, B, C, D) control the randomness of this attractor.
“Curve” act like a small waveshaper (EXP/LIN/LOG).
The interpolation switch allow to change the shape of the output.
This module is very similar to the JONG VCO : only the frequency range changes.

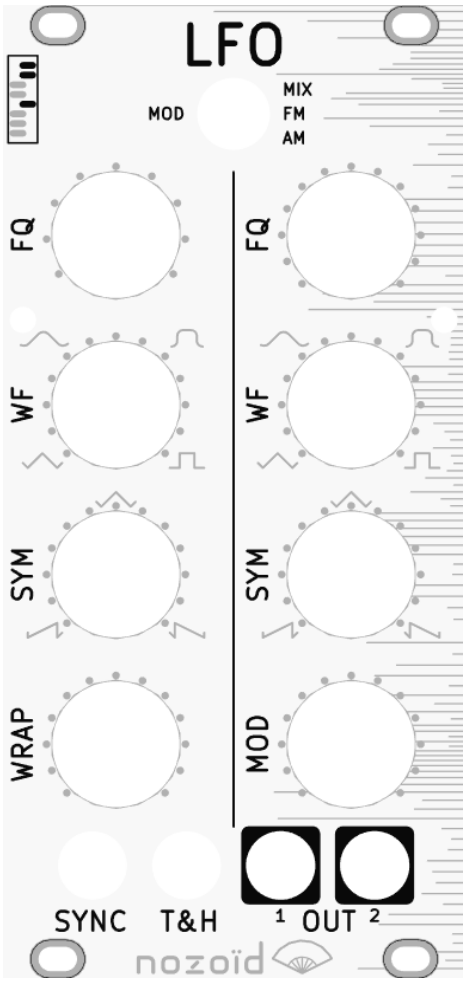
Peter De Jong Audio Attractor



Peter de Jong chaotic attractor at audio frequency
Module number: 146 (10010010)
Potentiometer 1: Frequency of the 1st oscillator (from about 10Hz to 20KHz)
Potentiometer 2: Frequency modulation
Potentiometer 3: Curve (log/lin/exp)
Potentiometer 4: Curve modulation
Potentiometer 5: 1st parameter of the attractor
Potentiometer 6: 2nd parameter of the attractor
Potentiometer 7: 3rd parameter of the attractor
Potentiometer 8: 4th parameter of the attractor
In 1: Frequency modulation value (fine tune (1V) if not plugged)
In 2: Curve modulation value (chaotic oscillator if not plugged)
Out 1: X out
Out 2: Y out
Selector: interpolation type Top: linear (saw) Middle: none (square) Bottom: cubic (curve)

This module is a strange attractor : it generate pseudo random value at various frequency. This module can be used like a step sequencer or a LFO. The 4 parameters (A, B, C, D) control the randomness of this attractor.
“Curve” act like a small waveshaper (EXP/LIN/LOG).
The interpolation switch allow to change the shape of the output.
This module is very similar to the JONG LFO : only the frequency range changes.

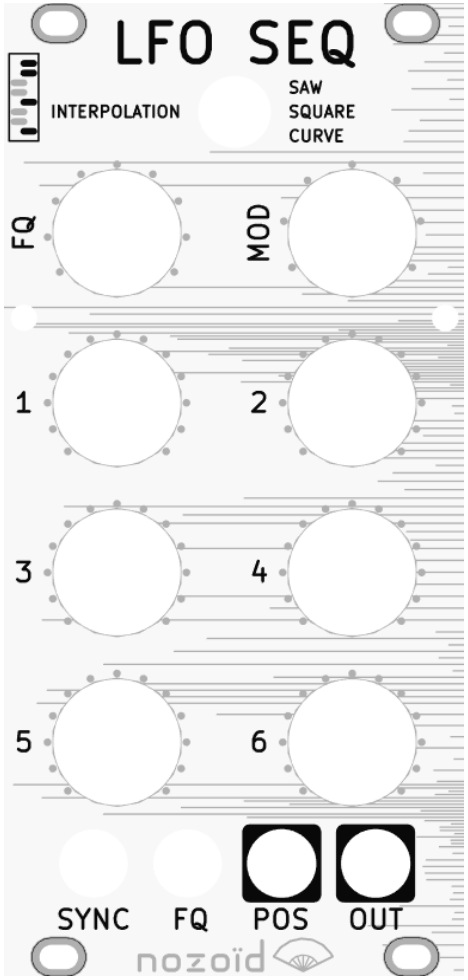
Dual LFO



Dual LFO
Module number: 200 (11001000)
Potentiometer 1: LFO1 Frequency (from about 30s to 1KHz)
Potentiometer 2: LFO2 Frequency (from about 30s to 1KHz)
Potentiometer 3: LFO1 Waveform (triangle, sinus, round square, square)
Potentiometer 4: LFO2 Waveform (triangle, sinus, round square, square)
Potentiometer 5: LFO1 Symmetry (rising saw, triangle, falling saw)
Potentiometer 6: LFO2 Symmetry (rising saw, triangle, falling saw)
Potentiometer 7: LFO1 Wrap
Potentiometer 8: LFO2 Modulation
In 1: LFO1 synchro (when plugged the LFO1 frequency is a multiple of this clock)
In 2: LFO2 Trig & Hold (when plugged, hold value until a new edge)
Out 1: LFO 1 Out
Out 2: LFO 2 Out
Selector: Modulation type: Top: Mix from LFO1 to LFO2 Middle: Frequency modulation Bottom: Amplitude modulation

Dual LFO with parametric wave form. The output of this LFO can continuously change from saw/sin/square, and from a rising saw/triangle/falling saw.
The 1st LFO output can be wrapped to get even more complex Waveform.
When a clock is provide, it automatically synchronize to this signal. The Frequency potentiometer select the divisor/multiplier of the input frequency from 1/16, 1/8, ¼, ½, 1, 2, 4, 8, 16.
The 2nd LFO has a Trig and Hold input : when pluged, the output is updated only at rising edge of this signal. This generate square patterns.
The Modulation potentiometer of the 2nd LFO allow the LFO 1 to modulate the LFO 2 in 3 different ways. This module create a huge range of different modulation!

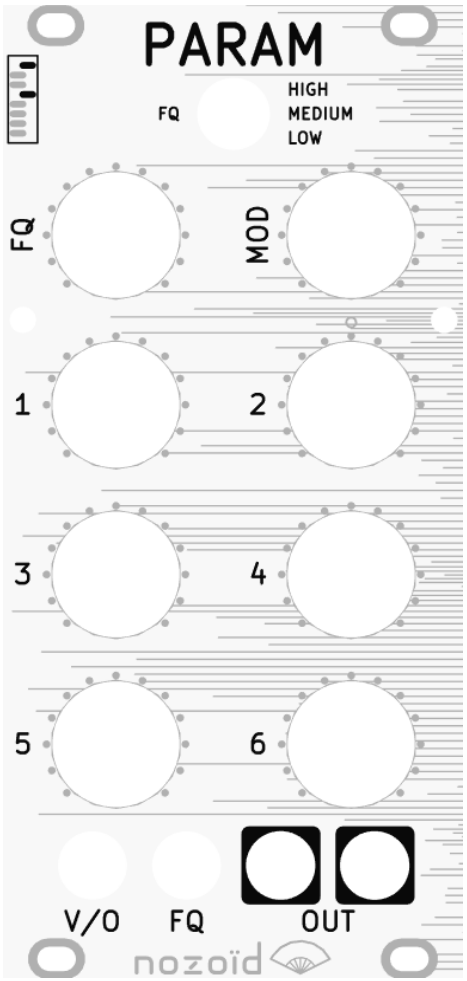
LFO Sequencer



6 step LFO / Sequencer
Module number: 201 (11001001)
Potentiometer 1: Frequency (from about 10s to 150Hz)
Potentiometer 2: Frequency modulation
Potentiometer 3: Step 1 value
Potentiometer 4: Step 2 value
Potentiometer 5: Step 3 value
Potentiometer 6: Step 4 value
Potentiometer 7: Step 5 value
Potentiometer 8: Step 6 value
In 1: LFO synchro (when plugged the LFO frequency is a multiple of this clock)
In 2: Frequency modulation value
Out 1: LFO position output (look like a 6 steps sawtooth)
Out 2: LFO main output
Selector: Interpolation type Top: linear (saw) Middle: none (square) Bottom: cubic (curve)

This module is halfway between a sequencer and a LFO : you can select 6 point to create the shape of the LFO curve. This LFO can be synchronize to any clock.
When a sync signal is provide, the Frequency potentiometer select simple divider/multiplier of the frequency (1/16, 1/8, 1/4, ½, 1, 2, 4, 8, 16), while the modulation frequency potentiometer add more complex fraction of this frequency (1/1, 3/4, 4/5, 7/8, 8/7, 5/4, 4/3)
Frequency modulation input is not used when a clock is provide.

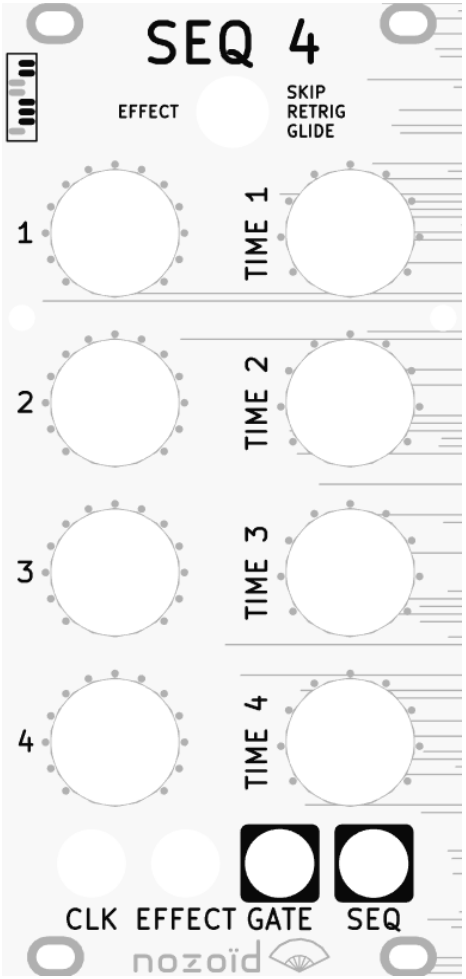
Parametric oscillator



6 points parametric audio oscillator
Module number: 144 (10010000)
Potentiometer 1: Oscillator frequency (from about 0.1Hs to 20KHz depending on the settings)
Potentiometer 2: Oscillator frequency modulation
Potentiometer 3: Point 1
Potentiometer 4: Point 2
Potentiometer 5: Point 3
Potentiometer 6: Point 4
Potentiometer 7: Point 5
Potentiometer 8: Point 6
In 1: Oscillator frequency (1V/Octave)
In 2: Oscillator frequency modulation value (1V if unplugged)
Out 1: Oscillator output 1
Out 2: Oscillator output 2 (same waveform as out left but 1 Octave higher)
Selector: Frequency range Top: High (10~20000Hz) Middle: medium (0.1~200Hz) Bottom: low (0.1~20Hz)

This module is a VCO with parametric waveform: the output passes through the 6 points set by the potentiometer value. This module is design to generate a signal going throw a waveshaper

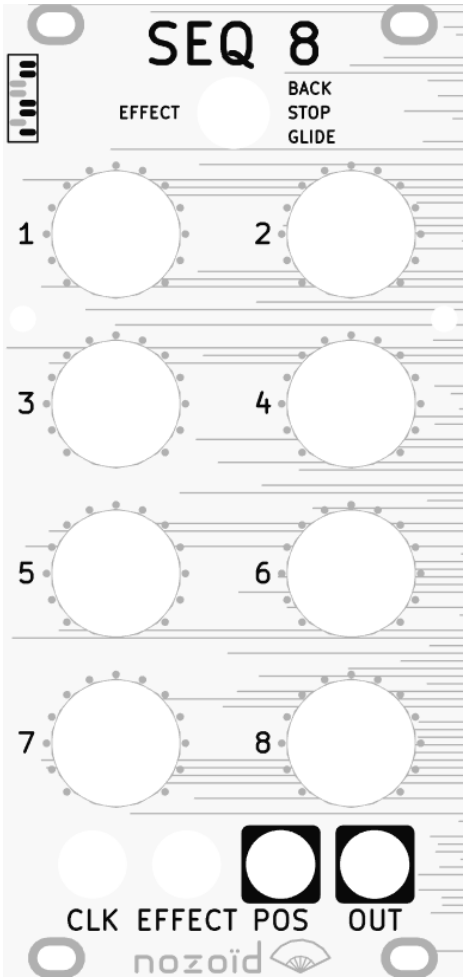
4 steps sequencer



4 step sequencer with parametrable step length
Module number: 206 (11001110)
Potentiometer 1: Step 1 duration (0 to skip, 1, 2, 3, 4, 5, 6, 7, 8)
Potentiometer 2: Step 1 value
Potentiometer 3: Step 2 duration
Potentiometer 4: Step 2 value
Potentiometer 5: Step 3 duration
Potentiometer 6: Step 3 value
Potentiometer 7: Step 4 duration
Potentiometer 8: Step 4 value
In 1: Clock
In 2: Effect
Out 1: Gate out
Out 2: Seq out
Selector: Effect mode Top: Skip (do not mark next step) Middle: retrig (mark multiple gate during a step) Bottom: glide

Since duration of all steps can be adjusted, this 4 steps sequencer is not so basic.
Rythm as complex as : “1 0 0 0 2 0 3 0 0 0 4 0 0 0 0 0” can be programmed is few seconds...
This 4 steps sequencer synchronize to a clock input.
The “effect” input can be used to trig one of the 3 possible effect available (Skip a step, retrig multiple gate, or glide from 1 value to another)

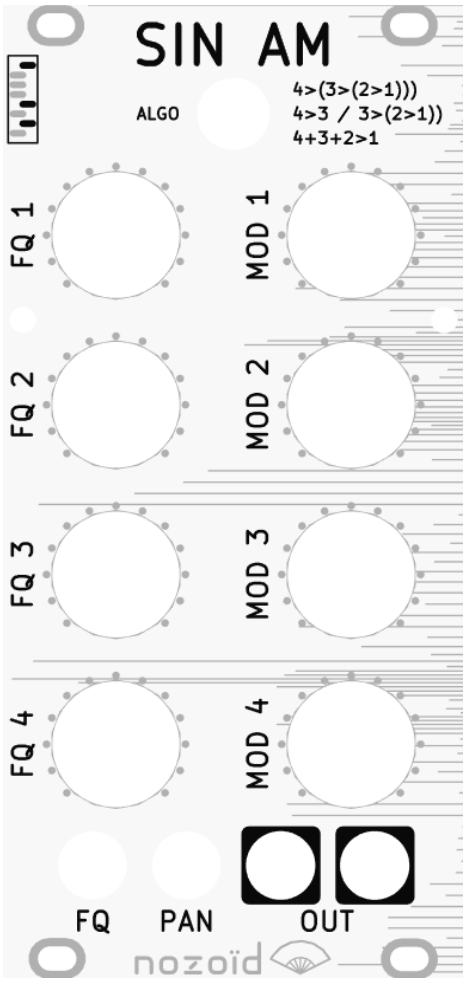
8 steps sequencer



8 step sequencer with back, freeze or glide effect
Module number: 205 (11001101)
Potentiometer 1: Step 1
Potentiometer 2: Step 2
Potentiometer 3: Step 3
Potentiometer 4: Step 4
Potentiometer 5: Step 5
Potentiometer 6: Step 6
Potentiometer 7: Step 7
Potentiometer 8: Step 8
In 1: Clock input
In 2: Effect
Out 1: Position
Out 2: Step out
Selector: Effect type Top: Back (when a high level is apply to this input, a clock signal goes backward) Middle: Stop (clock signal are ignored when this input is high) Bottom: glide (linear interpolation of the output when this input is high)

This is a simple 8 steps sequencer.

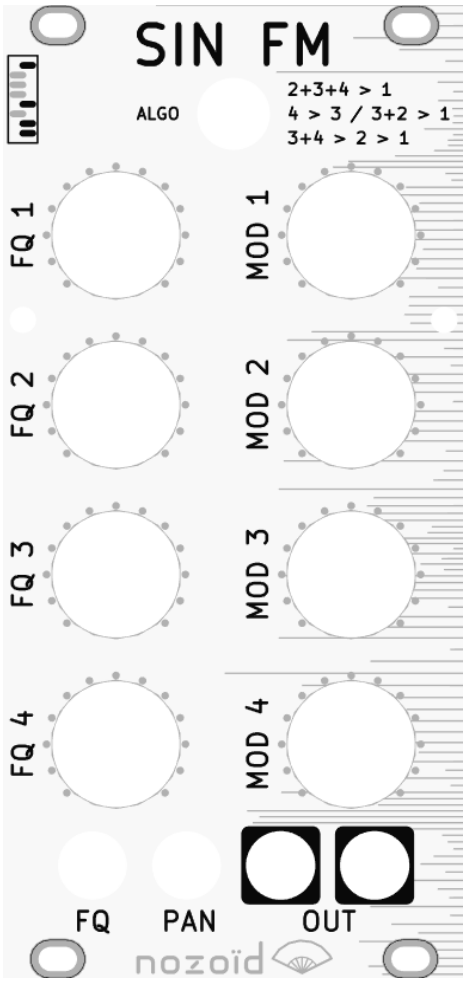
Sinusoidal AM modulation



4 oscillators AM modulation
Module number: 138 (10001010)
Potentiometer 1: Oscillator 1 frequency (from about 10Hz to 20KHz)
Potentiometer 2: Oscillator 1 frequency modulation (1V/Octave at full modulation)
Potentiometer 3: Oscillator 2 frequency
Potentiometer 4: Oscillator 2 modulation gain
Potentiometer 5: Oscillator 3 frequency
Potentiometer 6: Oscillator 3 modulation gain
Potentiometer 7: Oscillator 4 frequency
Potentiometer 8: Oscillator 4 modulation gain
In 1: Oscillator 1 frequency modulation value (1V if unplugged)
In 2: Panoramic (center if unplugged)
Out 1: Left output
Out 2: Right output (same waveform as out left 1 but 1 Octave higher)
Selector: Connection order of the oscillators Top: 4 > (3 > (2 > 1)) Middle: 4 > 3 / 3 > (2 >1) Bottom: 4+3+2 > 1 (clipping may occur providing harsher sound for high modulation)

Amplitude modulation of 4 sinusoidal signals using 3 different algorithm. This module is a sound generator.

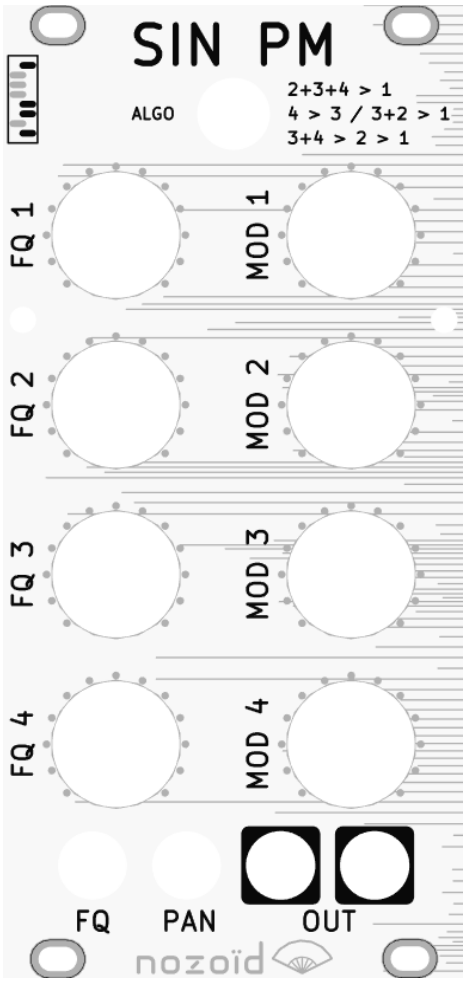
Sinusoidal FM modulation



4 oscillators FM modulation
Module number: 139 (10001011)
Potentiometer 1: Oscillator 1 frequency (from about 7Hz to 20KHz)
Potentiometer 2: Oscillator 1 frequency modulation
Potentiometer 3: Oscillator 2 frequency
Potentiometer 4: Oscillator 2 modulation gain
Potentiometer 5: Oscillator 3 frequency
Potentiometer 6: Oscillator 3 modulation gain
Potentiometer 7: Oscillator 4 frequency
Potentiometer 8: Oscillator 4 modulation gain
In 1: Oscillator 1 frequency modulation value (1V if unplugged)
In 2: Panoramic (center if unplugged)
Out 1: Left output
Out 2: Right output (same waveform as out left but 1 Octave higher)
Selector: Connection order of the oscillators Top: Oscillators 2, 3 and 4 controls the oscillator 1 frequency Middle: Oscillators 2 and 3 control the oscillator 1 frequency, oscillator 4 control oscillators 3. Bottom: Oscillators 3 and 4 control the oscillator 2 frequency, oscillator 2 control oscillators 1.

Frequency modulation (exponential) of 4 sinusoidal signals using 3 different algorithm. This module is a sound generator.

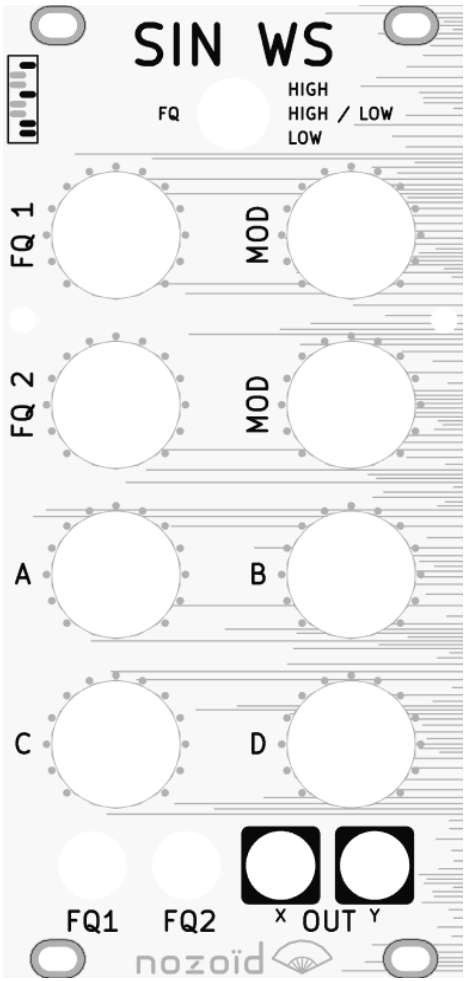
Sinusoidal PM modulation



4 oscillators Phase Modulation
Module number: 141 (10001101)
Potentiometer 1: Oscillator 1 frequency (from about 7Hz to 20KHz)
Potentiometer 2: Oscillator 1 frequency modulation
Potentiometer 3: Oscillator 2 frequency
Potentiometer 4: Oscillator 2 modulation gain
Potentiometer 5: Oscillator 3 frequency
Potentiometer 6: Oscillator 3 modulation gain
Potentiometer 7: Oscillator 4 frequency
Potentiometer 8: Oscillator 4 modulation gain
In 1: Oscillator 1 frequency modulation value (1V if unplugged)
In 2: Panoramic (center if unplugged)
Out 1: Left output
Out 2: Right output (same waveform as out left but 1 Octave higher)
Selector: Connection order of the oscillators Top: Oscillators 2, 3 and 4 controls the oscillator 1 frequency Middle: Oscillators 2 and 3 control the oscillator 1 frequency, oscillator 4 control oscillators 3. Bottom: Oscillators 3 and 4 control the oscillator 2 frequency, oscillator 2 control oscillators 1.

Phase modulation of 4 sinusoidal signals using 3 different algorithm. This module is a sound generator.

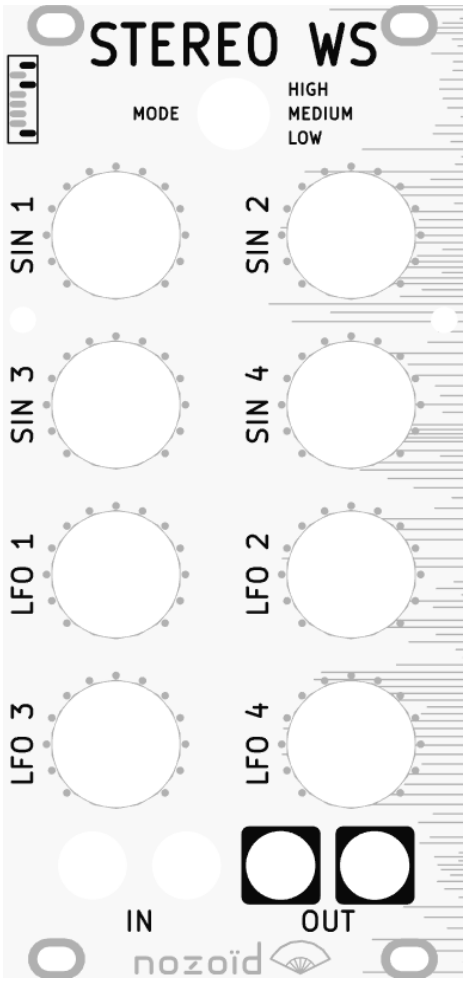
Stereo Sinusidal Wave Shaper



Dual oscillator and a Peter De Jong waveshaper
Module number: 147 (10010011)
Potentiometer 1: Frequency of the 1st oscillator (from about 1Hz to 1KHz)
Potentiometer 2: Frequency modulation
Potentiometer 3: Frequency of the 2nd oscillator
Potentiometer 4: Frequency modulation
Potentiometer 5: 1st parameter of the attractor
Potentiometer 6: 2nd parameter of the attractor
Potentiometer 7: 3rd parameter of the attractor
Potentiometer 8: 4th parameter of the attractor
In 1: 1st frequency modulation value (1V if not plugged)
In 2: 2nd frequency modulation value (1V if not plugged)
Out 1: X out
Out 2: Y out
Selector: Frequency range Top: FQ1 : high / FQ2 : high Middle: FQ1 : high / FQ2 : low Bottom: FQ1 : low / FQ2 : low

This modules is based on 2 oscillator that go 3 time through a dual input waveshaper based on Peter De Jong equations. The switch change the frequency range off the oscillator from a VCO to a LFO.
A, B, C, D are the coefficient of the waveshaper.

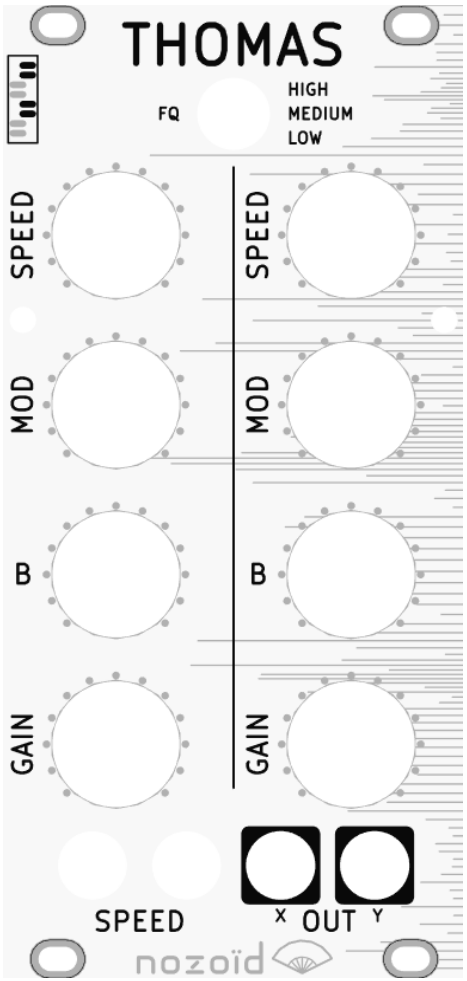
Stereo Wave Shaper



Stereo Wave Shaper
Module number: 161 (10100001)
Potentiometer 1: A
Potentiometer 2: PHASE A
Potentiometer 3: B
Potentiometer 4: PHASE B
Potentiometer 5: C
Potentiometer 6: PHASE C
Potentiometer 7: D
Potentiometer 8: PHASE D
In 1: Audio in 1
In 2: Audio in 2
Out 1: Out A
Out 2: Out B
Selector: effect type Top: High sound modification Middle: Medium sound modification Bottom: Low sound modification

This waveshaper is design to use 2 audio input in order to mix them in a non linear way, using 1 or 2 iteration of this equation:
OUT 1 = Sin (A*1) - Cos (B*2)
OUT 12 = (Sin B*2) - Cos (A*1)
4 different LFO at fixed frequency can change the offset of the signals in order to create variation of the output timbre.

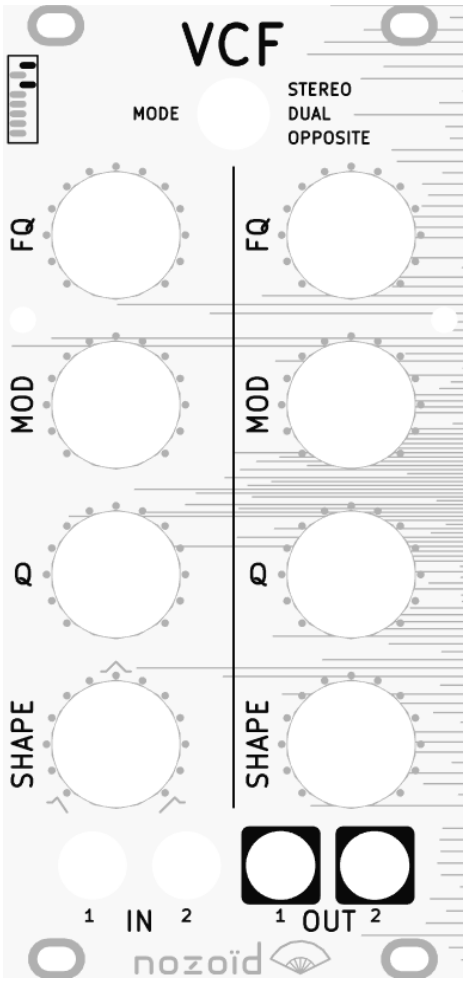
Thomas chaotic attractor



Dual Thomas strange attractor for CV or audio noise source
Module number: 204 (11001100)
Potentiometer 1: Speed of the attractor 1 (relative frequency of the oscillator)
Potentiometer 2: Speed modulation
Potentiometer 3: Control factor of the attractor
Potentiometer 4: Gain of the X/Y value of the attractor
Potentiometer 5: Speed of the attractor 2 (relative frequency of the oscillator)
Potentiometer 6: Speed modulation
Potentiometer 7: Control factor of the attractor
Potentiometer 8: Gain of the X/Y value of the attractor
In 1: Speed modulation 1 value (fine tune if not plugged)
In 2: Speed modulation 2 value (fine tune if not plugged)
Out 1: Sum of both attractor X value
Out 2: Sum of both attractor Y value
Selector: Frequency range Top: High Middle: medium Bottom: low

Dual chaotic attractor. The output is the sum of (X,Y) value of both attractor.
B is the control factor of the algorithm.
The frequency range selector allow the module to oscillate at audio frequency, or lower frequency. It can be used as a VCO or LFO.

Dual Morphing VCF



Dual filter with parametric control of the frequency responce
Module number: 160 (10100000)
Potentiometer 1: VCF 1 cutoff frequency
Potentiometer 2: VCF 2 cutoff frequency
Potentiometer 3: VCF 1 cutoff frequency modulation (fine tune in stereo mode)
Potentiometer 4: VCF 2 cutoff frequency modulation (fine tune in stereo mode)
Potentiometer 5: VCF 1 resonance factor
Potentiometer 6: VCF 2 resonance factor
Potentiometer 7: VCF 1 frequency response (from low pass 24dB/O, low pass 12dB/O, band pass 12dB/O, high pass 12dB/O)
Potentiometer 8: VCF 2 frequency response (from low pass 24dB/O, low pass 12dB/O, band pass 12dB/O, high pass 12dB/O)
In 1: Filter audio in
In 2: Filter audio in (audio in 1 if unplugged) or frequency modulation depending on the filter mode
Out 1: Filter 1 out
Out 2: Filter 2 out
Selector: Filter mode Top: Stereo (2 independent filter without frequency modulation) Middle: dual (audio 1 is send to both filter, audio 2 is used as the frequency modulation) Bottom: opposite (like dual, but modulation is positive for filter 1, negative for filter 2)

Dual parametric filter. The shape of the frequency response can be continuously adjusted from low pass, band pass, high pass. With dual in/out, this filter can be used for stereo signals.
LP 24dB is at 0%, LP12dB is at 25%, BP is at 50% and HP at 100% of the “morph” potentiometer.